a	x	v_1 (ft./sec.)	u_1 (mi./hr.)	t_1 (secs.)	(t_2-t_1) (secs.)	t_2 (secs.)	s_1 (ft.)	s_2-s_1 (ft.)
1	9.6825	93.75	63.92	93.754	19.365	113.12	4,394.9	605.1
2	11.278	127.2	86.72	63.595	22.555	86.15	4,044.5	955.5
3	12.264	150.4	102.55	50.13	24.53	74.66	3,770.3	1,229.7
100	18.735	351.0	239.32	3.51	37.47	40.98	616.0	4,384.0
∞	19.573	383.15	261.24	0	39.149	39.15	0	5,000

355 (Mechanics). Proposed by HORACE OLSON, Chicago, Ill.

A solid spheroid, axes a, a, b, is placed with its axis of revolution vertical. From its highest point a particle is projected horizontally with a speed s. Where will it leave the spheroid, assuming that it slides on the surface without friction?

SOLUTION BY WILLIAM HOOVER, Columbus, Ohio.

The entire motion is in a vertical central section of the spheroid and all of such sections are equal ellipses.

Let $a^2y^2 + b^2x^2 = a^2b^2$ (1) be the equation of any one of them.

Resolving tangentially,

$$v\frac{dv}{ds} = g\frac{dy}{ds}. \tag{2}$$

Multiplying by ds and integrating,

$$v^2 = 2gy + C. \tag{3}$$

When $v = v_0$, $y = b$, and $C = v_0^2 - 2gb$, and (3) becomes

$$v^2 = v_0^2 - 2g(b - y). \tag{4}$$

If ρ = the radius of curvature, we have, at the point where the particle leaves the curve

$$\frac{v^2}{\rho} = -g\frac{dx}{ds}. \tag{5}$$

Now from (1),

$$\rho = \{(a^2 - b^2)y^2 + b^4\}^{3/2} \div ab^4 \tag{6}$$

and

$$\frac{dx}{ds} = -ay \div \{(a^2 - b^2)y^2 + b^4\}^{1/2}. \tag{7}$$

Substituting (6) and (7) in (5) and reducing,

$$(a^2 - b^2)gy^3 + 3b^4gy + b^4(v_0^2 - 2gb) = 0, \tag{8}$$

a cubic for y. Now put $a = a/2$, $b = b/2$, $v_0 = s$.

In (8), if $b = a$, and $v_0 = 0$, $y = \frac{2}{3}a$, as is well known for a circle of radius a.

Also solved by PAUL CAPRON.

QUESTIONS AND DISCUSSIONS.

SEND ALL COMMUNICATIONS TO U. G. MITCHELL, University of Kansas, Lawrence.

NEW QUESTION.

35. Is the theorem given below new or has it previously been published?

THEOREM. *If two parallel planes, π and π', cut sections from a cylindrical surface S and two spherical surfaces S_1 and S_2, and if the sum of the sections of S_2 is equal in area to the sum of the sections of S and S_1, then the part of S_2 included*